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We claim:

1. An isolated nucleic acid sequence which encodes a polypeptide with desaturase activity, selected from the following group:
 - 5 a) a nucleic acid sequence with the sequence shown in SEQ ID NO: 1,
 - 10 b) nucleic acid sequences which, as a result of the degeneracy of the genetic code, are derived from the nucleic acid sequence shown in SEQ ID NO: 1,
 - 15 c) derivatives of the nucleic acid sequence shown in SEQ ID NO: 1 which encode polypeptides with the amino acid sequences shown in SEQ ID NO: 2 and which have at least 75% homology at amino acid level without substantially reducing the enzymatic activity of the polypeptides.
- 20 2. An amino acid sequence encoded by a nucleic acid sequence as claimed in claim 1.
3. An amino acid sequence as claimed in claim 2, encoded by the sequence shown in SEQ ID NO: 1.
- 25 4. A nucleic acid construct comprising a nucleic acid sequence as claimed in claim 1, where the nucleic acid sequence is linked to one or more regulatory signals.
- 30 5. A vector comprising a nucleic acid sequence as claimed in claim 1 or a nucleic acid construct as claimed in claim 4.
- 35 6. An organism comprising at least one nucleic acid sequence as claimed in claim 1 or at least one nucleic acid construct as claimed in claim 4.
7. An organism as claimed in claim 6, which is a plant, a microorganism or an animal.
- 40 8. A transgenic plant comprising a functional or nonfunctional nucleic acid sequence as claimed in claim 1 or a functional or nonfunctional nucleic acid construct as claimed in claim 4.
- 45 9. A process for the preparation of unsaturated fatty acids, which comprises introducing at least one nucleic acid sequence as claimed in claim 1 or at least one nucleic acid

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construct as claimed in claim 4 into an oil-producing organism, growing this organism, isolating the oil contained in the organism and liberating the fatty acids contained in the oil.

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10. A process for the preparation of triglycerides with an increased content of unsaturated fatty acids, which comprises introducing at least one nucleic acid sequence as claimed in claim 1 or at least one nucleic acid construct as claimed in claim 4 into an oil-producing organism, growing this organism and isolating the oil contained in the organism.

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11. A process for the preparation of saturated fatty acids, which comprises introducing at least one nonfunctional nucleic acid sequence as claimed in claim 1 or at least one nonfunctional nucleic acid construct as claimed in claim 4 into an oil-producing organism, growing this organism, isolating the oil contained in the organism and liberating the fatty acids contained in the oil.

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20. A process for the preparation of triglycerides with an increased content of saturated fatty acids, which comprises introducing at least one nonfunctional nucleic acid sequence as claimed in claim 1 or at least one nonfunctional nucleic acid construct as claimed in claim 4 into an oil-producing organism, growing this organism and isolating the oil contained in the organism.

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30. A process as claimed in claim 9 or 10, wherein the unsaturated fatty acids have an increased calendulic acid content.

35. A method as claimed in any of claims 9 to 12, wherein the organism is a plant or a microorganism.

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15. An unsaturated fatty acid prepared by a process as claimed in claim 9.

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16. A triglyceride with an increased content of unsaturated fatty acids prepared by a process as claimed in claim 10.

45 17. A saturated fatty acid prepared by a process as claimed in claim 11.

18. A triglyceride with an increased content of saturated fatty acids prepared by a process as claimed in claim 12.

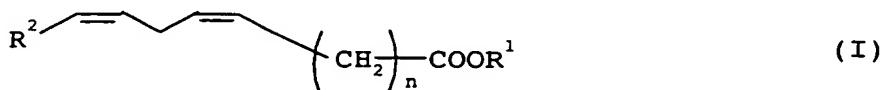
19. The use of a nucleic acid sequence as claimed in claim 1 or of a nucleic acid construct as claimed in claim 4 for the generation of transgenic plants.

5 20. The use of a nucleic acid sequence as claimed in claim 1 or of a fragment thereof for isolating a genomic sequence via homology screening.

10 21. The use of unsaturated or saturated fatty acids as claimed in claim 15 or 17 or triglycerides with an increased content of unsaturated or saturated fatty acids as claimed in claim 16 or 18 for the preparation of foodstuffs, animal feed, cosmetics or pharmaceuticals.

15 22. An enzyme which is encoded by a nucleic acid sequence as claimed in claim 1 and which converts a fatty acid of the structure I,

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which has two double bonds separated from each other by a methylene group, to give a triunsaturated fatty acid of the structure II,

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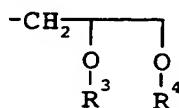


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the three double bonds of the fatty acid being conjugated and the substituents and variables in the compounds of the structures I and II having the following meanings:

R¹ = hydrogen, substituted or unsubstituted, unsaturated or saturated, branched or unbranched C₁-C₁₀-alkyl-,

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R² = substituted or unsubstituted, unsaturated or saturated C₁-C₉-Alkyl-

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